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CHARACTERISTICS OF VESTIBULOSENSORY REACTIONS
STUDIED BY EXPERIMENTAL CALORIC TEST

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16. Abstract Vestibulo-sensory reactions were studied in 135 workers who were in contact with nitroethers, by the method of an experimental caloric test. The response vestibulo-sensory reactions were recorded by means of an electroencephalograph. The changes in the sensory reaction depended on the duration of the workers' contact with toxic agents. A study of illusion reactions by the labyrinth calorization widens diagnostic possibilities in the examination of functional condition of the vestibular analyser considerably.			
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CHARACTERISTICS OF VESTIBULOSENSORY REACTIONS STUDIED BY EXPERIMENTAL CALORIC TEST

V. Z. Kapranov

Extensive experimental and clinical material has been accumulated on the mechanism for the vestibular effects on the development of the autonomic complex during stimulation of the labyrinth (V. I. Voyachek, 1927; A. V. Zhukovich, 1946; K. L. Khilov, 1969; V. Ye. Busygin and Yu. G. Grigor'yev, 1962; S. S. Markaryan and R. A. Vartbaronov, 1966; Yu. G. Grigor'yev et al., 1970; and others). /48*

A number of works in the domestic literature have covered a study of the sensory reactions in response to adequate stimulation of the labyrinth (N. I. Kostrov, 1957; V. G. Bazarov, 1964; Yu. G. Grigor'yev et al., 1970; A. Ye. Kurashvili and V. I. Babi-yak, 1975, and others), however, there is no information on the effect of caloric stimulation of the labyrinth on the thresholds of the vestibulosensory reactions.

The purpose of this work is to investigate the duration of the vestibulosensory reactions in workers of the chemical industry who are exposed to the effect of nitroesters (nitroglycerin and its analogs). The duration of the sensory reaction was determined from the time for the rotation illusion sensation in response to experimental stimulation of the labyrinth by irrigating the meatus acusticus externus with 100 ml of water at a temperature

*Numbers in margin indicate pagination in original foreign text.

of 19°C for 10 s (N. S. Blagoveshchenskaya, 1962). At the moment the sensation of vertigo appeared the subject pressed a button installed in chair arm rest, and this signal was noted on the electroencephalographic tape in the form of a flash-up. At the end of the rotation sensation the subject again pressed the button and a second mark was recorded on tape of the self-recorder. The material was digitally processed on an M-220 computer.

As a result of the study on the duration of illusory sensation during caloric stimulation of the labyrinth in a group of practically healthy individuals (control group--30 people) a considerable variability was noted in this reaction, while the average duration of the vestibulosensory reaction ($M \pm m$) was 47.84 ± 4.23 s, $\sigma \pm 24.33$.

The results of a statistical analysis of the illusory reactions in the workers of the main production groups indicate an increase in their duration in the group of workers with the greatest production length of service ($P < 0.001$; see table).

Comparison of the indices for the vestibulosensory reactions in workers of the main production groups with the same indices in individuals of the control group indicates the change in the vestibulosensory reactions in the workers who have contact with nitroesters. A dependence is noted of the change in thresholds of illusory sensations on the duration of contact with the toxic substances. Our studies made it possible to hypothesize that the cause for the disruption in the vestibulosensory reactions in workers of the industry we studied is the change as a result of the general toxic effect of nitroesters on the organism of the workers, and the functional condition of the cerebral centers that regulate the sensory reactions.

The study of the vestibular functions in workers of the industry we studied revealed a varying degree of important

CHANGES IN DURATION OF VESTIBULOSENSORY REACTION DEPENDING ON LENGTH OF WORK

Length of work, years	Statistical Index					
	n	M	$\pm m$	$\pm \sigma$	r	D
Control	30	47.84	4.23	24.33	—	—
from 0 to 2	15	60.46	5.36	18.57	1.84	0.05
from 2 to 5	20	74.80	6.96	31.08	3.31	0.01
from 5 to 10	60	76.39	4.23	32.26	4.77	0.001
over 10	40	81.02	5.35	32.10	4.86	0.001

labyrinth reactions. Thus, in 14 people (9.8%) in the presence of pronounced vestibulosemory and vestibulo-autonomic reactions there was a considerable suppression of the vestibulosomatic reactions (nystagmus). In 2 workers (1.5%) complete absence of nystagmus was noted with sharply pronounced autonomic and sensory /49 manifestations. Dissociation of the reflex vestibular reactions was determined by the disruption in the normal strength correlations between the amount of the response reaction of the organism and the strength of the employed stimulus. These paradoxical reactions reflect the phase condition of the vestibular analyzer and indicate the decompensated stage of affection of the vestibular analyzer in the workers who contacted nitroesters (N. S. Blagoveshchenskaya, 1978).

The vestibulosemory reactions are constant components of the reflex reaction in response to the caloric stimulus of the labyrinth. A study of the illusory reactions by experimental caloric test permits a more complete assessment of the functioning of the vestibular analyzer. The given test can be recommended to assess the condition of the vestibulosemory system in a study of the vestibular analyzer in the clinical practice of occupational diseases.

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